



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test Report No. : E058R-032

Applicant : OPTICIS CO., LTD.

Address : #501, Bucksan Technopia, 434-6, Sangdaewon-Dong, Chungwon-Ku,
Sungnam-City, Kyungki-Do, 462-120, Korea

Manufacturer : OPTICIS CO., LTD.

Address : #501, Bucksan Technopia, 434-6, Sangdaewon-Dong, Chungwon-Ku,
Sungnam-City, Kyungki-Do, 462-120, Korea

Type of Equipment : Optical 1394B Repeater Module (Class B Computing Device Peripheral)

FCC ID : PPNBTH20050711

Model Name : M4-200

Serial number : N/A

Total page of Report : 15 pages (including this page)

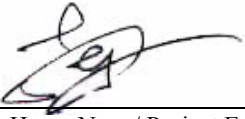
Date of Incoming : June 02, 2005

Date of Issuing : August 20, 2003

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART B, Class B**.

This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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**1. VERIFICATION OF COMPLIANCE**

- APPLICANT : OPTICIS CO., LTD.
- ADDRESS : #501, Bucksan Technopia, 434-6, Sangdaewon-Dong, Chungwon-Ku, Sunghnam-City,
Kyungki-Do, 462-120, Korea
- CONTACT PERSON : Mr. Jaehyun, Cho / Assistant Engineer
- TELEPHONE NO : +82-31-737-8033~9
- FCC ID : PPNBTH20050711
- MODEL NO/NAME : M4-200
- SERIAL NUMBER : N/A
- DATE : August 20, 2003

EQUIPMENT CLASS	JBP - Peripheral Device for Class B Computing Device
E.U.T. DESCRIPTION	Optical 1394B Repeater Module - Unintentional Radiator
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15, SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	Yes
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



2. GENERAL INFORMATION

2.1 Product Description

The OPTICIS CO., LTD., Model M4-200 (referred to as the EUT in this report) is an Optical 1394B Repeater Module that can extend signal transfer range up to 1,640 feet (500 meter) distance and speed up to 800Mbps in full duplex data rate. A pair of VCSEL transmitter and PIN PD receiver is loaded inside of Opticis FireWire Repeater for high performance. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	98.304 MHz
POWER REQUIREMENT	DC12V, 3A from AC/DC Adaptor
NUMBER OF LAYERS	4 Layers
EXTERNAL CONNECTOR	DC Power In, 1394B Cable In/Out, LC Optical Patch Cord In/Out

2.2 Model Differences:

-. None

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Test System Details

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	FCC ID	Description	Connected to
M4-200	OPTICIS CO., LTD.	PPNBTH20050711	EUT (TX)	PC and EUT(RX)
M4-200	OPTICIS CO., LTD.	PPNBTH20050711	EUT (RX)	PYPO 1394b DRIVE KIT and EUT(TX)
AP03611-UV	Anam Instrument	N/A	AC/DC ADAPTOR	EUT(RX)
MP25	SAMSUNG	DOC	PC	-
LME-17S	HUMAX	DOC	MONITOR	PC
5530KP	BTC	DOC	KEYBOARD	PC
KP-600	ACE-Q	DOC	MOUSE	PC
API-814	ADS TECH	N/A	PYPO 1394b DRIVE KIT	EUT(RX)
2225C	HP	DSI6XU2225	PRINTER	PC
020-0470	CARDINAL	GDE0196	MODEM	PC



2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
TX MAIN BOARD	OPTICIS	N/A	N/A
RX MAIN BOARD	OPTICIS	N/A	N/A

3.2 EUT Operating Condition

- The EUT was connected between PC and PYPO 1394B Drive Kit with optical fiber and then the data were continuously read and written from the HDD of PYPO 1394B Drive Kit to the HDD of PC.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
Optical 1394B Repeater Module (TX)	N	Y N (Fiber-Optic)	1.2 (P), 1.2 (D) 10 (D)
Optical 1394B Repeater Module (RX)	N	Y N (Fiber-Optic)	1.2 (P), 1.2 (D) 10 (D)
AC/DC ADAPTER (for EUT(RX))	N	N (DC OUT)	1.5 (P), 1.2 (D)
PC	N	-	1.5 (P), -
MONITOR	N	Y	1.5 (P), 1.2(D)
ADAPTER (for Monitor)	N	N (DC OUT)	1.5 (P), 1.2 (D)
KEYBOARD	N/A	Y	1.3 (D)
MOUSE	N/A	Y	1.3 (D)
PYPO 1394b DRIVE KIT	N	Y	1.5 (D)
PRINTER	N	Y	1.5 (P), 1.5 (D)
MODEM	N	Y	1.5 (P), 1.5 (D)

* The marked “(P)” means the Power Cable and “D” means the I/O Cable.

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Optical 1394B Repeater Module (TX)	N	N/A	Y	BOTH END
	N	N/A (Fiber-Optic)	N	N/A (Fiber-Optic)
Optical 1394B Repeater Module (RX)	N	N/A	Y	BOTH END
	N	N/A (Fiber-Optic)	N	N/A (Fiber-Optic)
AC/DC ADAPTER (for EUT(RX))	Y	EUT(RX) END	Y	EUT(RX) END
PC	-	-	-	-
MONITOR	Y	BOTH END	Y	BOTH END
ADAPTER (for Monitor)	Y	MONITOR END	Y	PC END
KEYBOARD	N	N/A	Y	PC END
MOUSE	N	N/A	Y	PC END
PYPO 1394b DRIVE KIT	N	N/A	Y	BOTH END
PRINTER	N	N/A	Y	BOTH END
MODEM	N	N/A	Y	BOTH END

3.5 Equipment Modifications

- The EMI gasket was added to the inside of front and top enclosure.

3.6 Configuration of Test System

Line Conducted Test : The EUT was connected to PC and AC/DC Adaptor. And the power line of PC and Adaptor were connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2003 7.2.3 to determine the worse operating conditions.

Remark: Conducted emission test was performed at each mode on AC/DC adaptor of the EUT and PC.

Radiated Emission Test : Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2003 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.



4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Connecting adapter on the EUT (RX) side	X
Power supply of the PC	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
The data were continuously read and written from the HDD of PYPO 1394b DRIVE KIT to the HDD of PC.	X

**5. FINAL RESULT OF MEASUREMENT**

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Conducted Emission Test

Humidity Level : 41 % Temperature : 21 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107(a)
 Type of Test : CLASS B
 Result : PASSED BY -4.40 dB at 20.50 MHz under average mode

EUT : Optical 1394B Repeater Module Date: July 01, 2005
 Operating Condition : The data were read and written from the HDD of PYPO 1394B drive kit to the HDD of PC.
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)
 Remark : Power supply of PC

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.51	N	43.00	56.00	-13.00
3.42	H	42.20	56.00	-13.80
3.48	N	42.60	56.00	-13.40
8.52	N	46.20	60.00	-13.80
8.62	H	46.00	60.00	-14.00
20.50	H	45.80	60.00	-14.20
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
0.51	H	32.50	46.00	-13.50
8.52	N	43.10	50.00	-6.90
8.62	H	43.80	50.00	-6.20
20.50	H	45.60	50.00	-4.40

Line Conducted Emissions Tabulated Data

Remark : "H": Hot Line, "N": Neutral line



Remark : Connecting adaptor on RX side of the EUT

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.18	N	48.39	64.49	-16.10
0.24	H	41.08	62.10	-21.02
0.30	H	38.81	60.11	-21.30
0.36	H	37.39	58.61	-21.22
16.21	N	48.85	60.00	-11.15
24.15	N	52.83	60.00	-7.17
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
0.18	N	34.35	54.49	-20.14
0.24	H	26.33	52.10	-25.77
16.21	N	25.93	50.00	-24.07
24.15	N	38.76	50.00	-11.24

Line Conducted Emissions Tabulated Data

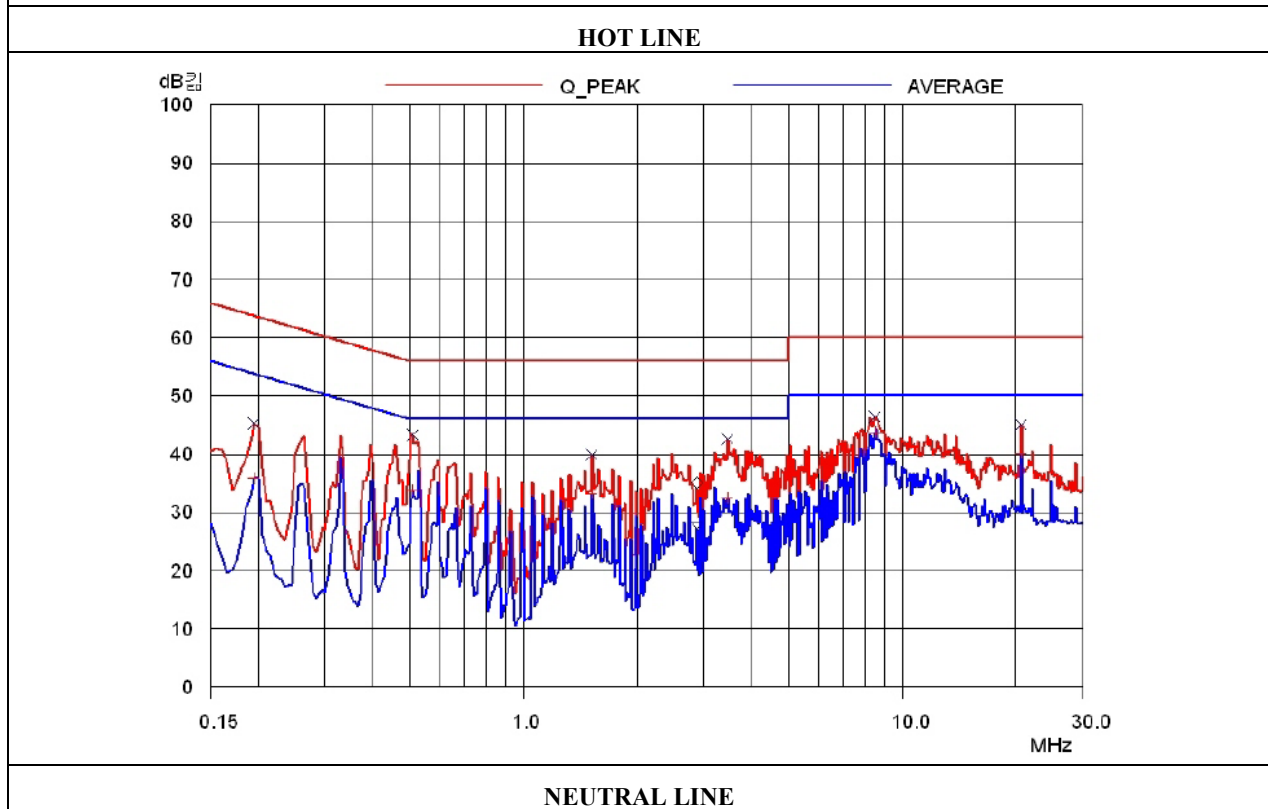
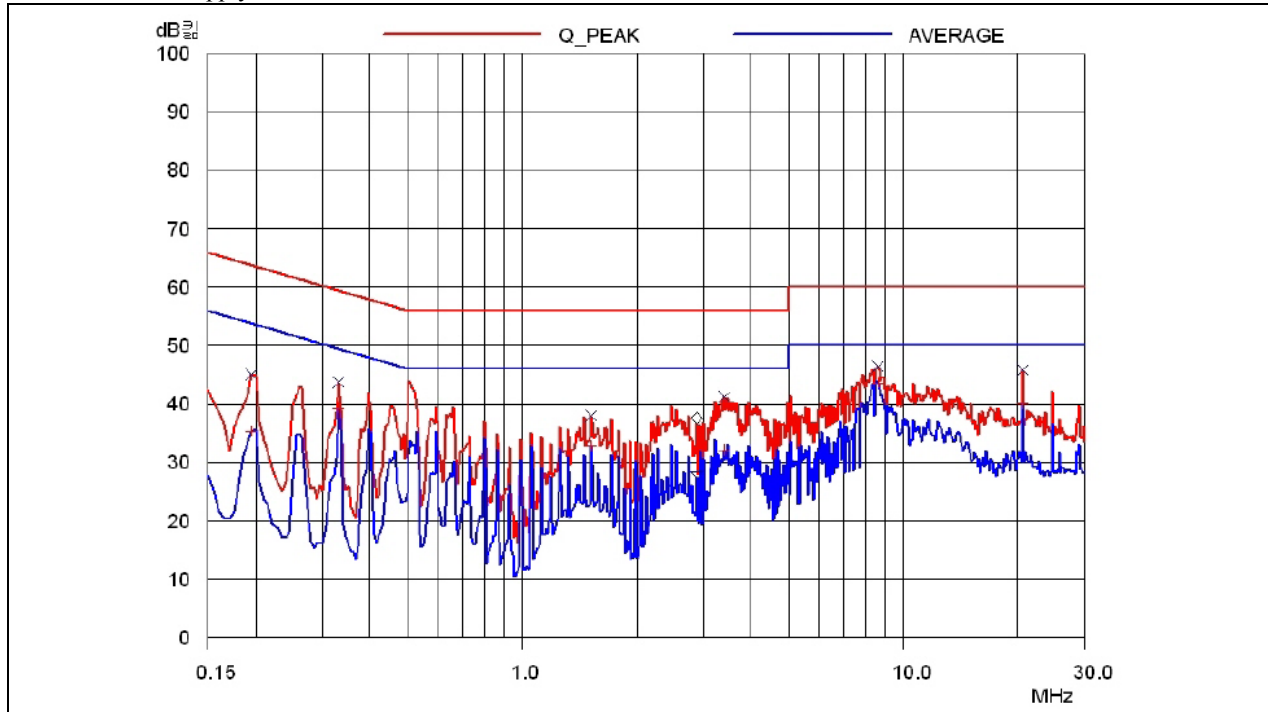
Remark : "H": Hot Line, "N": Neutral line

See next page for an overview sweep performed with peak and average detector.

Tested by: Eung-Chan, Kim / Test Engineer

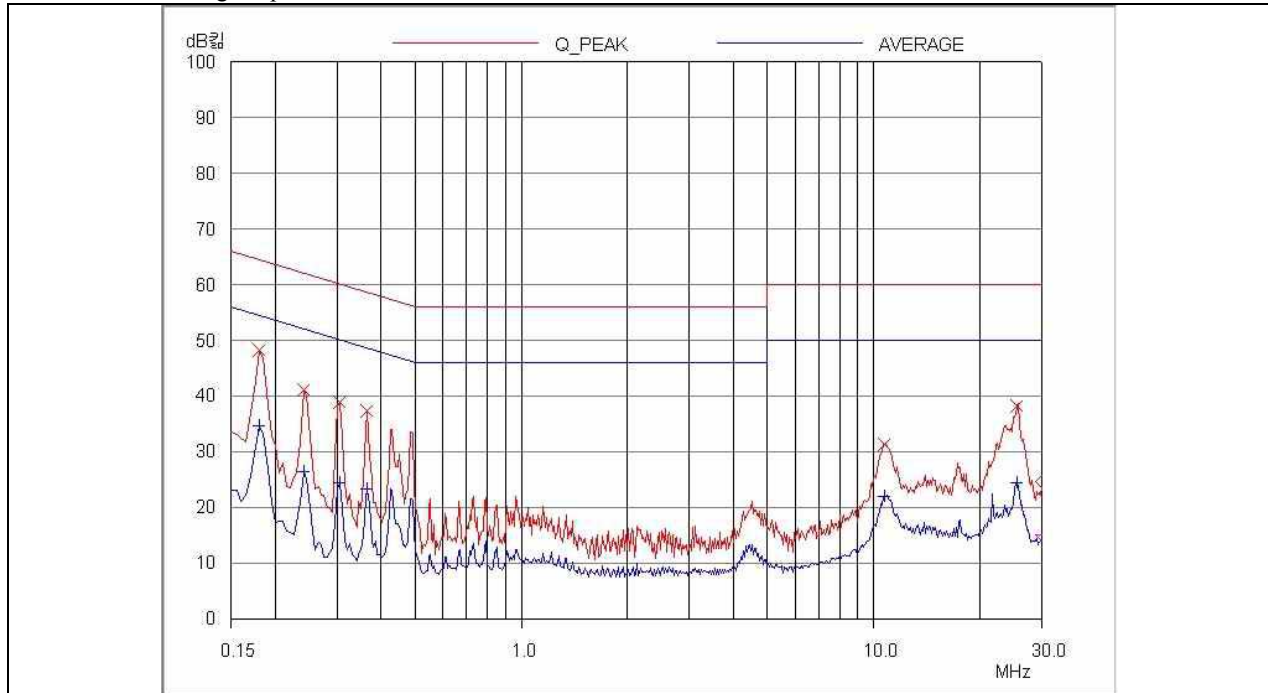


Remark: Power supply of PC

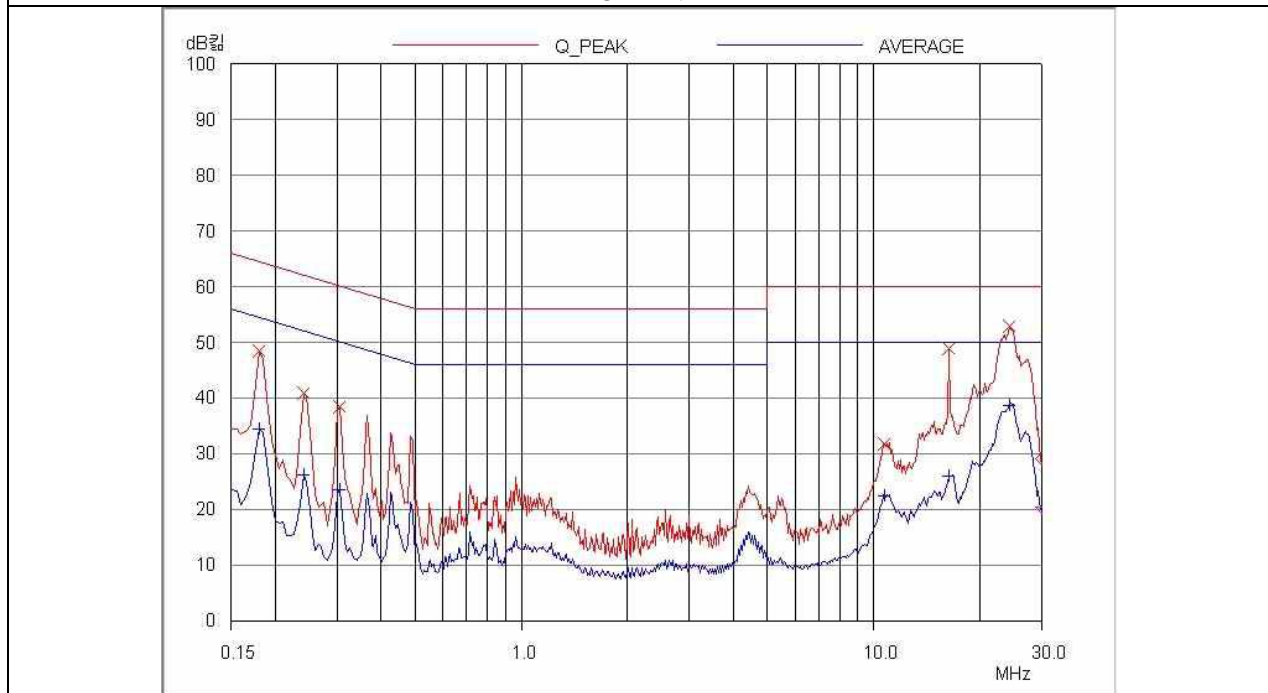




Remark: Connecting adaptor on RX side of the EUT



HOT LINE



NEUTRAL LINE



5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 49 % Temperature : 23 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)
Type of Test : CLASS B
Result : PASSED BY -4.36 dB at 767.80 MHz

EUT : Optical 1394B Repeater Module Date: June 14, 2005
Operating Condition : The data were read and written from the HDD of PYPO 1394B drive kit to the HDD of PC.
Frequency of Emission : 30MHz – 1000MHz
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
82.00	25.10	V	7.07	1.74	33.91	40.00	-6.09
196.50	16.40	V	15.89	2.80	35.09	43.52	-8.43
393.17	21.20	V	15.31	4.37	40.88	46.02	-5.14
598.80	17.60	V	18.65	5.30	41.55	46.02	-4.47
767.80	13.70	V	20.95	7.01	41.66	46.02	-4.36
983.02	12.00	V	22.60	8.27	42.87	53.97	-11.10

Radiated Emissions Tabulated Data

Tested by: Eung-Chan, Kim / Test Engineer



6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)



7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS10	827864/005	DEC/04	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/05	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/05	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	APR/05	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	APR/05	12MONTH	■
6.	Quasi-Peak Adapter	HP	8574B	2811A01432	APR/05	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	APR/05	12MONTH	
8.	Biconical antenna	EMCO	3110	9003-1121	FEB/05	12MONTH	
		Schwarzbeck	VHA9103	91031852	JAN/05		■
9.	Log Periodic antenna	EMCO	3146	9001-2614	FEB/05	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	FEB/05		■
10.	LISN	EMCO	3825/2	9109-1867	JUL/05	12MONTH	■
				9109-1869	NOV/04		■
		Schwarzbeck	NSLK 8128	8128-216	JUN/05		
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■